

What Is Claimed Is:

1. A purified nucleic acid segment encoding an alfalfa plant antifungal polypeptide.
- 5 2. The nucleic acid segment of claim 1 that encodes a polypeptide comprising the amino acid sequence of SEQ ID NO: 2 or SEQ ID NO:14.
- 10 3. The nucleic acid segment of claim 1 that comprises the nucleic acid sequence of SEQ ID NO:13 or the complement thereof or a sequence that hybridizes to SEQ ID NO:13 under conditions of high stringency.
- 15 4. The nucleic acid segment of claim 1 that comprises the nucleic acid sequence from between position 105 and position 242 of SEQ ID NO: 13, or the complement thereof, or a sequence which hybridizes to the sequence from between position 105 and position 242 of SEQ ID NO:13 under conditions of high stringency.
- 20 5. The nucleic acid segment of claim 1 further defined as comprising the nucleic acid sequence of SEQ ID NO: 10, or the complement thereof, or a sequence which hybridizes to the sequence of SEQ ID NO: 10 under conditions of high stringency.
- 25 6. An isolated DNA molecule having a nucleotide sequence selected from the group consisting of:
 - a) the nucleotide sequence of FIG. 1 (SEQ ID NO:10 between positions 18 and position 507);
 - b) the nucleotide sequence of SEQ ID NO: 13;
 - c) the nucleotide sequence of SEQ ID NO:13 from position 105 to 242;

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- d) nucleotide sequences which through degeneracy of the genetic code encode the same peptide as that encoded by the nucleotide sequence of a), b) or c);
- e) the complement of any of a), b), c) or d); and
- f) nucleotide sequences which hybridize to any of (a-f) under conditions of high stringency.

7. The nucleic acid segment of claim 1 further defined as an RNA segment.

8. A DNA segment comprising an isolated alfalfa plant antifungal gene.

10 9. The DNA segment of claim 8 comprising an isolated *Medicago* gene.

15 10. The DNA segment of claim 9 that encodes an antifungal polypeptide that includes a contiguous amino acid sequence of at least 15 amino acids of SEQ ID NO: 2 or SEQ ID NO:14.

11. The DNA segment of claim 10 further defined as a recombinant vector.

20 12. The DNA segment of claim 11 wherein said DNA is operatively linked to a promoter, said promoter expressing the DNA segment.

25 13. The DNA segment of claim 12 wherein the promoter is selected from the group consisting of the FMV 35 S promoter, the CaMV 35S promoter, the ssRUBISCO promoter, the EIF-4A promoter, the LTP promoter, the actin promoter, and the ubiquitin promoter.

14. A recombinant host cell comprising the DNA segment of claim 10.

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15. The recombinant host cell of claim 14 further defined as a plant cell, said plant cell being selected from the group consisting of apple, alfalfa, barley, broccoli, cabbage, canola, carrot, citrus, corn, cotton, garlic, oat, onion, pea, peanut, pepper, potato, rice, rye, sorghum, soybean, strawberry, sugarbeet, sugarcane, tomato, turf grasses, and wheat.

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16. The recombinant host cell of claim 14 further defined as a potato plant cell.

17. A method of using a DNA segment that encodes an isolated alfalfa plant antifungal polypeptide, comprising the steps of:
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a) preparing a recombinant vector in accordance with claim 11 in which the alfalfa plant antifungal polypeptide encoding DNA segment is positioned under the control of a promoter;
b) introducing said recombinant vector into a host cell;
c) culturing said host cell under conditions effective to allow expression of the encoded antifungal polypeptide; and
d) collecting said expressed antifungal polypeptide.

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18. An isolated nucleic acid segment selected from the group consisting of:
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a) the nucleotide sequence of any of SEQ ID NO:3,5,6-7,9-10 or 13;
b) the complement of any of SEQ ID NO:3,5,6-7,9-10 or 13;
c) nucleotide sequences which by virtue of the degeneracy of the genetic code encode the same peptide product as any of SEQ ID NO: 3,5,6-7,9-10 or 13; and
d) nucleotide sequences that hybridize to any of SEQ ID NO:3,5,6-7,9-10, or 13 under conditions of high stringency.

19. An isolated alfalfa plant antifungal polypeptide encoded by the DNA of claim 6.
20. The polypeptide according to claim 19 comprising the amino acid sequence of SEQ ID NO: 2 or SEQ ID NO:14.

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21. The polypeptide of claim 19 wherein said polypeptide is isolated from *Medicago* alfalfa.

22. An isolated alfalfa plant antifungal polypeptide comprising the amino acid sequence of SEQ ID NO:2, SEQ ID NO:14 or functional variants thereof.

23. The polypeptide of claim 22 wherein the variant comprises a truncated fragment of said sequences of at least 8 amino acids.

- 15 24. A composition comprising an antifungally effective amount of the polypeptide of claim 19 in a suitable solvent.

- 20 25. ~~A transgenic plant having incorporated into its genome a transgene that encodes the antifungal polypeptide of claim 19.~~

26. The transgenic plant of claim 25 wherein the polypeptide has the amino acid sequence of SEQ ID NO:2 or SEQ ID NO:14.

- 25 27. The transgenic plant of claim 25 wherein the polypeptide is encoded by the DNA of SEQ ID NO:13 or sequences that hybridize to SEQ ID NO:13 under conditions of high stringency.

28. Progeny of the plant of claim 25.

29. Seeds from the plant of claim 25.

30. Clones of the plant of claim 25.

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31. A method of controlling plant fungus, comprising providing to a plant an antifungally effective amount of the polypeptide of claim 19.

10 32. The method of claim 31 wherein the polypeptide is provided by the composition of claim 24.

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33. The method of claim 31 wherein the polypeptide is provided by transforming the plant cells with a vector comprising a DNA encoding the polypeptide having the amino acid sequence of SEQ ID NO: 2 or SEQ ID NO:14 to allow expression of an antifungally effective amount of the encoded polypeptide.

sub a4 *33*
add a5'